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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 01/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/273,691

Applicant(s)

HUANG, TINGHUI

Examiner

Mike Qi

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-18 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103 (a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-18, 20-22 are rejected under 35 U.S.C. 103 (a) as being unpatentable over US 6,100,948 (Kim et al) in view of US 5,517,341 (Kim et al) and US 5,995,178 (Fujikawa et al).

Claims 1, 10 and 20, Kim's 948 discloses (col. 4, lines 1-68, and in Fig.5) that a front-side repairable TFT-LCD assembly composing:

- a TFT-LCD equipped with wirings such as gate lines (G_1, G_2, G_3, \dots) and data lines (D_1, D_2, D_3, \dots), i.e., a first multiplicity of buslines;
- using repair lines (RL) intersects the gate lines and the data lines with an insulating layer therebetween and the repair lines (RL) formed around a display region, i.e., the repair lines positioned outside and in parallel with a circuitry on the TFT-LCD.

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Kim's 948 does not expressly disclose that coating a black matrix film on a glass cover plate and patterning the black matrix film having apertures corresponding to the repair lines, so that the laser beam can pass therethrough for welding a repair line to a busline.

However, Kim's 341 discloses (col.3, lines 12-28, and Fig.2) that the black matrix (20) is formed by appropriately patterning a light-shielding layer (i.e., positioned juxtaposed to the repair lines and the buslines), using a conventional photolithography process to define the aperture area (i.e., coating the black matrix film on the front glass plate 101), so that the laser beam can pass the aperture to perform the repair for the buslines, and the laser beam will heat the wires for welding a repair line to a busline or for severing the shorts.

Using the patterned black matrix in the TFT-LCD will increase the display contrast, and using laser welding to repair the lines will minimize the disconnections and shorts in the crossing portion of wirings (see Kim's 341 abstract).

Concerning claims 10 and 20, using the glass substrate as a cover plate as disclosed in Kim's 341(Fig.2, glass substrate 101) for mounting the assembly would have been obvious.

Concerning claim 20, Kim's 341 discloses (col. 7, lines 3-21) that using laser beam to cut the short circuit between the scanning line and the signal line occurring at the cross portion, so that the laser beam must pass through the aperture.

Fujikawa also discloses (col.9, lines 30-39) that by the irradiation of an energy beam, the disconnected scanning line (15) are electrically connected via the metal portion (29a). Gate signals are transmitted through this bypass, thereby jumpering the disconnection (28).

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Such that, to repair a defective circuit must find the defective location first, and then to use laser beam irradiation energy to repair the defective circuit, and that would have been obvious to those skilled in the art.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use repair lines and black matrix film having apertures to allow a laser beam to pass therethrough, and welding a repair line to a busline by fusing as claimed in claims 1, 10 and 20 for achieving high contrast display and minimizing the disconnections and shorts.

Claims 2-3, 15-16, concerning the repair lines spaced-apart is three or five, Kim's 341 discloses (col.1, lines 47-51) a large screen display to obtain a high definition image needs to increase the number of pixels. When the number of pixels increased, the aperture ratio would be decreased, so that the brightness would be decreased. The repair lines are corresponding to the apertures. So that to arrange the spaced-apart between the repair lines would affect the aperture ratio.

Therefore, to select a proper spaced-apart between repair lines to attain an optimum results for the definition and the brightness of the image at least was obvious.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to select the three or five spaced-apart and parallel repair lines intersect the buslines as claimed in claims 2-3 and 15-16 for achieving an optimum display having high definition and high brightness.

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Claims 4 and 17, the first multiplicity of buslines comprises gate buslines and data buslines that was an obvious designation for the gate buslines and the data buslines.

Claims 5, 8, 11-12, see the explanation of Kim's 341 above. Patterning the black matrix film by a photolithographic method and forming the apertures in the black matrix film by an etching method was conventional.

Claims 7, 9, 13-14, 18, 21-22 see the explanation of Kim's 341 and Fujikawa above. Using the irradiation of a laser energy beam through the apertures either for welding the connections or for severing to cut the shorted circuits using the laser's heating as claimed in claims 7, 13, 18, 21-22; and first must find the defective location, and then to effecting the repair, as claimed in claims 9, 14 would have been obvious.

Response to Arguments

3. Applicant's arguments filed on Apr.6,2001 have been fully considered but they are not persuasive.

Applicant's only arguments are as follows:

(1) The reference Kim's 341 does not teach the welding of two lines together by the laser beam, and does not teach the formation of openings that are directly over the cross point of different signal lines in a black matrix film for the purpose of future repairs.

(2) The reference Fujikawa does not disclose the formation of a black matrix film or the formation of openings in the black matrix film that are directly over the cross point of two signal

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lines where repair may be needed, and does not teach the connecting together of two signal lines by a laser beam that passes through the opening in the black matrix film.

(3) The references do not submit motivations for such combination.

Examiner's responses to Applicant's **only** arguments are as follows:

(1) Kim's 341 discloses (col.3, lines 12-28, and Fig.2) that the black matrix (20) is formed by appropriately patterning a light-shielding layer using a conventional photolithography process to define the aperture area (i.e., formation of openings that are directly over the cross point), so that the laser beam can pass the aperture to perform the repair for the buslines, and the laser beam will heat the wires for welding a repair line to a busline or for severing the shorts.

(2) Fujikawa discloses (col.9, lines 30-39) that using irradiation of an energy beam to repair the disconnections for the signal lines, and that is to show the irradiation of an energy beam such as a laser beam. Therefore, using laser beam to weld the lines disconnection or to sever the shorts would have been obvious.

(3) Using the patterned black matrix in the TFT-LCD will increase the display contrast, and using laser welding to repair the lines will minimize the disconnections and shorts in the crossing portion of wirings, and that would be the motivations, and using laser beam for the strong heating result would have been obvious.

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Conclusion


4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
October 2, 2001


TOANTON
PRIMARY EXAMINER